Amendments to the Specification:

In paragraph [0004]:

As the calculation capability of computers becomes faster and faster and as network technology development progresses rapidly, using the computer as a multimedia interface and as a platform for internet ~~accessis~~ access is becoming increasingly popular with all types of users. As a result, demand for mass storage devices is rapidly increasing. Devices utilizing optical storage media such as ~~CD-R"s~~ CD-R's (Compact Disk-Recordable) are preferred for such kinds of storage as this media type is more inexpensive, compact, and portable than other types with respect to the same storage capacity. As various kinds of optical disk drives and burners appear with faster speed and more reliable operation, and ~~moreparticularly~~ more particularly, as ~~DVD-R"s~~ DVD-R's (Digital Versatile Disk-Recordable) appear with the same physical size but ~~withmany~~ with many times the storage capacity of ~~CD-R"s~~ CD-R's, optical disk drives and burners have practically become standard accessories of the personal computer.

In paragraph [0005]:

When an optical storage device such as a CD burner or a DVD burner writes data to an optical storage medium such as the CD-R or the DVD-R, the data is transformed into a storage format of the optical storage medium using an encoder of the optical storage device. In the prior art, the data format of the optical storage medium is usually the RLL Modulation (Run-Length Limited Modulation). For example, the data format of the CD-R is EFM (Eight-to-Fourteen Modulation), which belongs to the RLL Modulation. The descriptions presented in the ~~followingare~~ following are in the context of an EFM ~~Waveform~~ waveform, the data format of the CD-R. An EFM ~~Waveform~~ waveform encodes the data to be stored in the optical storage medium using a square wave of various waveform lengths (pulse-widths and intervals) along a time axis. Usually the

pulse-widths and the intervals of the square waves are all multiples of an EFM base period, ranging from three times the base period to eleven times the base period, and the optical storage device writes the data to the optical storage medium according to the EFM ~~Waveform~~ waveform. When the data is stored in the optical storage medium, a plurality of land sections and pit sections of various lengths on the optical storage medium are used to represent the data and the lengths of the land sections. The pit sections correspond with the waveform lengths of the EFM ~~Waveform~~ waveform. According to this relationship, the optical storage device can write the data onto the optical storage medium.

In paragraph [0006]:

After the optical storage device generates the EFM ~~Waveform~~ waveform with its EFM encoder, the EFM ~~Waveform~~ waveform will be input into an optical recording device, through which the optical storage device can delay the EFM ~~Waveform~~ waveform and generate a plurality of write parameters for controlling the writing power of a pickup of the optical storage device. The pickup emits a ~~Laser~~ laser according to the write signal to mark the surface of the optical storage medium and accordingly generate a plurality of pit sections of different lengths on the surface of the optical storage medium, so that the track including alternate land sections and pit sections as previously mentioned is formed. The optical recording apparatus according to the prior art usually has at least one counter ~~adapting~~ adapted to a comparator for delaying the EFM waveform to generate the write signal (refer to USP 5,526,333). That is to say, the counter counts continuously according to a received clock signal, and the comparator compares a control signal value relating the EFM waveform with the counting result of the counter to delay the EFM waveform and to output the write signal. The optical recording apparatus then controls the writing power of the pickup with the write signal. As a result, the resolution of the optical recording apparatus delaying the EFM waveform to generate the write signal is equal to the period of the clock signal.

In paragraph [0007]:

However, as the burning technology of the optical storage device increases, and more particularly, as more and more optical storage devices with higher writing speeds appear (for example, 32x and 48x writing speed burners), problems are encountered. The counter has a limited clock speed and the PLL (Phase Locked Loop) for generating the clock signal that drives the counter has a limited frequency. These factors hinder the optical recording apparatus of the prior art from functioning with satisfactory clock signal resolution and while delaying the EFM waveform to generate the write signal, the optical storage device cannot mark pit sections of accurate locations on the optical storage medium with the pickup. This poor clock signal resolution means that when reading the data, the clock jitter is excessively high ~~anderror~~ and error is sometimes even induced. ~~induced.~~

In paragraph [0009]:

Provided according to the claimed invention is a high-speed optical recording apparatus installed in an optical storage device for generating a write signal according to an RLL modulation waveform input to the high-speed optical recording apparatus, so as to control a writing power of a pickup in the optical storage ~~device.The~~ device. The recording apparatus comprising several components includes a clock generator for generating a first clock signal; an adjustment data storage unit for storing a plurality of sets of write strategy parameters, and selecting and outputting a corresponding set of write strategy parameters from plurality of the sets of write strategy parameters according to the RLL modulation ~~waveform.A~~ waveform. A rough delay unit electrically connected to the clock generator is used to receive the first clock signal, and is further electrically connected to the adjustment data storage unit to receive the selected set of write strategy

parameters, the rough delay unit for generating a fine delay parameter according to the selected set of write strategy parameters, and for delaying the RLL modulation waveform according to the first clock signal and the selected set of write strategy parameters to generate a first delay ~~signal.Also~~ signal. Also included is a fine delay chain electrically connected to the rough delay unit to receive the first delay signal and the fine delay parameter, the fine delay chain for delaying the first delay signal according to the fine delay parameter so as to generate the write signal, the fine delay chain having a plurality of serially connected delay cells, each delay cell delaying the first delay signal by a predetermined period.

In paragraph [0016]:

According to the preferred embodiment of the present invention, the clock generator 12 further generates a second clock signal CLK_2; and the rough delay unit 16 further comprises: a delay adjustment state machine 20 electrically connected to the clock generator 12 and the adjustment data storage unit ~~14to~~ 14 to receive the second clock signal CLK_2, and a rough delay counter 22 electrically connected to the clock generator 12 and the delay adjustment state machine ~~20to~~ 20 to receive the first clock signal CLK_1. The high-speed optical recording apparatus 10 further comprises: a channel ~~bit(EFM;~~ bit (EFM; Eight-to-Fourteen Modulation for CD) input interface 24 for receiving the NRZI channel bit waveform from an encoder 28 and generating an address signal; and a data storage setting interface 26 electrically connected to the adjustment data storage unit 14, and further electrically connected to a microprocessor 30 of the optical storage device to receive the sets of write strategy parameters and storing the sets of write strategy parameters into the adjustment data storage unit 14. In addition, the fine delay chain 18 is electrically connected to a pickup 32. As an adaptation, the rough delay counter 22 can be replaced with a rough delay shift register 22.

Paragraph [0017]:

The clock generator 12 is usually implemented by using a phase locked loop 34 to generate the first clock signal CLK_1, ~~which is~~ which is the input signal of the rough delay counter 22 and has a period equal to a value of one divided by a multiple of the base period of the NRZI waveform. The clock generator 12 further comprises a frequency divider 36 for dividing a frequency of the received first clock signal CLK_1 to generate the second clock signal CLK_2. The second clock signal CLK_2 is connected to the delay adjustment state machine 20 as an input signal and has a period equal to the base period of the EFM waveform. In addition, the delay cells of the fine delay chain 18 are designed to ~~havea~~ have a predetermined period less than the period of the second clock signal CLK_2 and, more specifically, to have a predetermined period equal to a value of one divided by a multiple of the base period of the NRZI waveform. For example, the predetermined period could be equal to the base period of the EFM waveform divided by thirty-two (1/32 the base period of the EFM waveform).

Paragraph [0018]:

The plurality of sets of the write strategy parameters stored in the adjustment data storage unit 14 ~~representsthe~~ represents the waveform characteristics of a writing power waveform for driving the pickup 32. Each pit section on the optical storage medium corresponds with a previous land section, a current pit section, and a next land section of the NRZI waveform. In each set of the plurality of sets of write strategy parameters, some of the write strategy parameters are determined according to lengths of the previous land section and the current pit section, some of the write strategy parameters are determined according to lengths of the current pit section and the next land section, and some of the write strategy parameters are determined simply according to the length of the current pit or land section. As a result of the this rule, the plurality of sets of write strategy

parameters stored in the adjustment data storage unit 14 are stored in two ~~groups:the~~ groups: the LP (previous Land section-current Pit section) group of parameters and the PL (current Pit section-next Land section) group of ~~parameters. The~~ parameters. The write strategy parameters determined simply according to the length of the current pit section can be stored in either group. In addition, waveform lengths of each pit section and each land section are all multiples of the EFM base period (that is, the base period of the NRZI waveform, shown as "T" in Fig.1). The multiple ranging from three times the base period to eleven times the base ~~period.Combinations~~ period. Combinations of different lengths of the pit sections and the land sections can be stored together corresponding with different parameters stored in the adjustment data storage unit 14 as shown in Fig.1. The address signal generated by the NRZI input interface 24 is determined according to the lengths of the previous land section, the current pit section, and the next land section, and corresponds with proper write strategy parameters.

In paragraph [0020]:

The operation principle of the high-speed optical recording apparatus 10 is described as follows. When the NRZI input interface 24 receives an NRZI waveform from the encoder 28, the NRZI input interface 24 generates an address signal according to the lengths of the previous land section, the current pit section, and the next land section of the EFM ~~waveform.The~~ waveform. The EFM waveform is sent to the delay adjustment state machine 20 and the address signal is sent to the adjustment data storage unit 14. When the adjustment data storage unit 14 receives the address signal, the adjustment data storage unit 14 selects a corresponding set of write strategy parameters from the LP group of parameters and the PL group of parameters, and outputs the selected set of write strategy parameters to the delay adjustment state machine 20.

In paragraph [0021]:

Then, the delay adjustment state machine 20 generates a rough delay parameter and a fine delay parameter according to the selected set of write strategy parameters and delays the EFM modulation waveform according to the second clock signal CLK_2 and the selected set of write strategy parameters so as to generate a second delay signal ~~S_2.The~~ S_2. The second delay signal S_2 and the rough delay parameter are ~~transferredto~~ transferred to the rough delay counter 22, and the fine delay parameter is ~~transferredto~~ transferred to the fine delay chain 18. The rough delay counter 22 delays the second delay signal S_2 according to the first clock signal CLK_1 and the rough delay parameter so as to generate a first delay signal ~~S_1.The~~ S_1. The first delay signal S_1 is transferred to the fine delay chain 18. Finally, the fine delay chain 18 delays the first delay signal S_1 according to the fine delay parameter and generates a write signal ~~S_W.The~~ S_W. The write signal S_W is output to the pickup 32. The above mentioned writing power waveform is usually formed with a plurality of write signals S_W of different waveform characteristics, through which the write signals S_W can control the writing power of the pickup 32 to etch an optical storage medium.

In paragraph [0022]:

Please refer to Fig.2 showing a block diagram of the rough delay counter 22 in Fig.1. In the preferred embodiment of the present invention, the rough delay counter 22 comprises an input buffer 42, a counter 44, a comparator 46, and an output buffer 48. The input buffer 42, which is a ~~DFlip-Flop~~ D Flip Flop, is electrically connected to the delay adjustment state machine 20 for receiving at its data input the second delay signal S_2, and for receiving at its clock input the first clock signal CLK_1. The output signal of the input buffer 42 (the ~~DFlip-Flop~~ D Flip Flop 42) is output to the comparator 46. The counter 44 is a four-bit counter and also receives at its clock input the first clock signal CLK_1. The four-bit output of the counter 44 is electrically connected to the comparator 46.

Additionally the rough delay signal (that is, the rough delay parameter signal) is also sent to the comparator 46, wherein the rough delay signal, which is also a four-bit number in this embodiment, represents an amount for the rough delay counter 22 to delay the second delay signal S_2 in units of the period of the first clock signal CLK_1. Finally, the comparator 46 compares the rough delay signal with the output signal of the counter 44. When the values the rough delay signal and the output signal of the counter 44 are equal to each other, the comparator 46 outputs the second delay signal S_2 to the output buffer 48, which is also a ~~DFlip-Flop~~ D Flip Flop, where it is transferred to the output end of the rough delay counter 22. The output signal of the rough delay counter 22 is referred to as the first delay signal S_1. Please note that the counter 44 can be replaced with a shift register 44 and the implementation of the present invention will not be hindered.

In paragraph [0024]:

As previously mentioned, the delay adjustment state machine 20 delays the NRZI modulation waveform according to the second clock signal CLK_2, so a resolution of the delay adjustment state machine 20 delaying the EFM modulation waveform is equal to a period of the second clock signal CLK_2, that is, a length of a base period of the EFM modulation waveform. Similarly, the rough delay counter 22 delays the second delay signal S_2 according to the first clock signal CLK_1 (delaying in units of the period for first clock signal CLK_1). The resolution of the rough delay counter 22 delaying the second delay signal S_2 is equal to the period of the first clock signal CLK_1. In addition the fine delay chain 18 delays the first delay signal S_1 in a unit of the predetermined period, so the resolution of the fine delay chain 18 delaying the first delay signal S_1 is equal to the predetermined period. Please note that the specific selection of a period of the first clock signal CLK_1, the predetermined period, and the output ends of the delay cells of the embodiment can be correspondingly adjusted as required by design constraints. For example, if the period of the first clock signal CLK_1 is equal to one fourth the base period

of the EFM modulation waveform (1/4 of the base period of the EFM modulation waveform), and the predetermined period is equal to 1/32 the base period of the EFM modulation waveform, the multiplexer 54 must select ~~thewrite~~ the write signal from the first delay signal S_1 and the other seven delayed signals of the first delay signal S_1 generated with different amount of delay cells that has the values of the rough delay signal (the signal of the rough delay parameter) and the fine delay signal (the signal of the fine delay parameter) properly set.